TOEROEK
ASSOCIATES, INC.

March 14, 2018

Mr. Brian Mitchell
Task Order Contracting Officer Representative
U.S. Environmental Protection Agency, Region 7 (EPA Region 7)
11201 Renner Boulevard
Lenexa, KS 662199

Subject: Field Sampling Investigation
Electrolux, Jefferson, Iowa
Sampling and Analysis Plan
Quality Assurance Project Plan Addendum
Contract No. EP-W-13-002, Task Order 035, Technical Directive No. 8

Dear Mr. Mitchell:

The Toeroek Associates, Inc. team is pleased to submit this Sampling and Analysis Plan and Quality Assurance Project Plan Addendum for the former Electrolux, Inc. facility in Jefferson, Iowa.

Please call me at (816) 412-1745 if you have any questions regarding this submittal.

Sincerely,

Kirk Mammoliti
Technical Directive Manager

Attachment

cc: Kristy Throckmorton, Task Order Contracting Officer Representative (cover letter only)
Paul Kieler, Toeroek Team Program Manager (cover letter only)
Kathy Homer, Toeroek Team Regional Manager (cover letter only)
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FORMER ELECTROLUX, INC. FACILITY
JEFFERSON, IOWA
FIELD SAMPLING INVESTIGATION
SAMPLING AND ANALYSIS PLAN

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 7

Task Order No.	:	035
Technical Directive No.	:	8
EPA Region	:	7
Date Prepared	:	March 14, 2018
Contract No.	:	EP-W-13-002
Project No.	:	103G2642035.08
Prepared by	:	Toeroek Team
Toeroek Team		
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CONTENTS

CONTENTS (Continued)

APPENDICES

FIGURES (see Appendix A)

TABLES (see Appendix B)

ACRONYMS AND ABBREVIATIONS

°C	Degrees Celsius
AMSL	Above mean sea level
bgs	Below ground surface
CVOC	Chlorinated volatile organic compound
DPT	Direct-push technology
DQO	Data quality objective
Electrolux	Electrolux, Inc.
EPA	U.S. Environmental Protection Agency
Golder	Golder Associates, Inc.
GPS	Global Positioning System
HCl	Hydrochloric acid
IDW	Investigation-derived waste
LDPE	Low density polyethylene
MCL	Maximum contaminant level
MS	Matrix spike
MSD	Matrix spike duplicate
PVC	Polyvinyl chloride
QA	Quality assurance
QAPP	Quality Assurance Project Plan
QC	Quality control
RCRA	Resource Conservation and Recovery Act
REPA	RCRA Enforcement and Permitting Assistance
RPD	Relative percent difference
RSL	Regional screening level
SAP	Sampling and analysis plan
SOP	Standard operating procedure
TCE	Trichloroethene
Tetra Tech	Tetra Tech, Inc.
TOCOR	Task Order Contracting Officer Representative
Toeroek	Toeroek Associates, Inc.
TOM	Task Order Manager
USGS	U.S. Geological Survey
VOC	Volatile organic compound
WWTP	Waste water treatment plant

1.0 INTRODUCTION

The Toeroek Associates, Inc. (Toeroek) team received Task Order No. 035 from the U.S. Environmental Protection Agency (EPA), under Contract No. EP-W-13-002, to provide assistance to Resource Conservation and Recovery Act (RCRA) state and federal program staff in EPA Region 7. Specifically, under Technical Directive No. 8 in Option Year 4 for this task order, EPA Region 7 has requested that the Toeroek team, which includes the Toeroek team subcontractor Tetra Tech, Inc. (Tetra Tech), conduct a groundwater sampling investigation at the former Electrolux, Inc. (Electrolux) facility in Jefferson, Iowa (see Figure 1, Appendix A). Under this technical directive, as directed by the EPA Task Order Contracting Officer Representative (TOCOR), the Toeroek team will conduct the following activities: (1) submit a Quality Assurance Project Plan (QAPP) and this Sampling and Analysis Plan (SAP) for EPA approval, (2) coordinate and procure a well drilling contractor, (3) plan the sampling event and clear the proposed drilling area for subgrade utilities, (4) coordinate with the analytical laboratory, (5) conduct the sampling event, and (6) submit a report of findings for EPA approval.

The Toeroek team has prepared this project-specific SAP in accordance with requirements outlined in Section 1.0 of its "Programmatic Quality Assurance Project Plan" for the RCRA Enforcement and Permitting Assistance (REPA) Zone III contract (Toeroek 2013). Section 2.0 of this SAP provides background information on the project. Section 3.0 presents overall project and quality assurance (QA) objectives. Section 4.0 specifies well installation, sampling, and analytical requirements. Section 5.0 discusses actions to be taken in response to any deviations from the REPA Zone III programmatic QAPP or this project-specific SAP. Sections 6.0 and 7.0 present the overall project schedule and key project personnel, respectively. References cited are listed in Section 8.0.

Appendix A includes figures showing the facility location, layout, and proposed monitoring well installation location maps. Appendix B contains tables, including sampling and analytical parameters, and the project schedule. Appendix C contains the project-specific QAPP Addendum to the Toeroek Programmatic QAPP for Region 7 (Toeroek 2013). The QAPP Addendum defines data quality objectives (DQO) of the facility sampling investigation, and specifies actions to ensure that all data obtained are of adequate quality to meet project objectives.

An additional investigation completed in April 2017 included collection of groundwater samples by use of a direct-push technology (DPT) drilling rig. Four groundwater samples were collected at two temporary wells downgradient (south) of the former facility. No VOC was detected in any sample collected during the sampling event. Not all targeted sampling intervals were reached during the investigation due to limitations of the DPT drilling rig (Toeroek 2017).

Although the contamination is currently confined within facility boundaries, the Jefferson public water supply is sourced from six groundwater wells in the Pleistocene sand gravel complex at approximately 150 feet bgs. Documents obtained from the Jefferson Water Department Source Water Protection Plan indicate that the southwest portion of the former facility is within the 10-year capture zone of four of the Jefferson supply wells (Tetra Tech 2016).

2.3 PHYSICAL SETTING

The former Electrolux facility is in an industrial and agricultural area on the northeast side of Jefferson, Iowa. Within the fenced perimeter of the former facility property is a mix of concrete building slabs, sidewalks, paved parking lots, and landscaped areas. The facility is bordered north by East Central Avenue, east by agricultural cropland, and south and west by Union Pacific Railroad tracks. Adjacent properties to the north and east are agricultural, and include several grain storage and processing facilities. Properties to the south and west are primarily agricultural and residential.

The facility is at a surface elevation of approximately 1,050 feet above mean sea level (AMSL). Regional topography slopes to the south-southeast toward Hardin Creek (U.S. Geological Survey [USGS] 1986).

2.0 BACKGROUND

The following subsections describe the facility location and demographics, the history of facility operations and investigations, and physical conditions in the facility area.

2.1 FACILITY LOCATION

The former Electrolux facility is at 601 East Central Avenue in Jefferson, Greene County, Iowa. The facility lies within the southeast quarter of Section 5, Township 83 North, Range 30 West (see Figure 1, Appendix A). The facility occupies approximately 7.5 acres of an approximately 20.75-acre parcel zoned for industrial use (Greene County 2016).

2.2 FACILITY BACKGROUND

The approximately 21-acre Electrolux property formerly included a 75,500-square-foot facility that manufactured dishwasher motor transmissions from 1960 until decommissioned in March 2011. The former manufacturing building was demolished, and the facility now includes a 7.5-acre area of concrete building slabs, parking lots, fencing, and sidewalks where manufacturing activities previously occurred (see Figure 2, Appendix A). In 2010, Electrolux began to evaluate potential subsurface contamination derived from manufacturing activities. A phased site assessment approach was followed from 2010 through 2013 to assess facility subsurface conditions downgradient of and in areas exterior to the former manufacturing facility. Additional groundwater monitoring was conducted in 2014, and a Site Assessment and Summary Report that included a conceptual site model was completed in October 2016 (Golder Associates, Inc. [Golder] 2016).

Results from the site assessments indicate that soil and groundwater at the facility are contaminated with chlorinated volatile organic compounds (CVOC), primarily trichloroethene (TCE) and its breakdown constituents within the upper tills (identified within 0 to 40 feet below ground surface [bgs]). CVOC-impacted soils were found only within the footprint of the former facility and adjacent landscaped areas within 1 to 7 feet bgs. Highest concentrations of CVOC contaminants in groundwater were detected in the yellow brown till within approximately 30 to 40 feet bgs near the southeast portion of the former facility. The October 2016 Site Assessment report concluded that natural attenuation and chlorinated degradation were occurring at the facility, and that the extent of contamination was within Electrolux property boundaries. Sources of volatile organic compound (VOC) contamination at the facility are believed to be former manufacturing operations within the eastern portion of the facility (Golder 2016).

3.0 OVERALL PROJECT AND QUALITY ASSURANCE OBJECTIVES

This section discusses overall objectives of the project and the project's QA. DQOs are further described in the REPA Zone III programmatic QAPP (Toeroek 2013) and in the QAPP Addendum (see Appendix C).

3.1 OVERALL PROJECT OBJECTIVES

The overall objective of the project is to obtain adequate data to allow EPA to evaluate the former facility in order to develop specifications for closure required to protect human health and the environment. This objective will be accomplished by adhering to the protocols established in the REPA Zone III programmatic QAPP (Toeroek 2013), this SAP, and the project-specific QAPP Addendum (Appendix C) while collecting and arranging for analyses of samples from the former Electrolux facility. This will ensure that data generated by the investigation are suitable for regulatory purposes. EPA standard operating procedures (SOP) include sampling procedures and analytical protocols to ensure that quality data are generated. Applications of EPA-approved sampling and analytical methods, such as those in the *Test Methods for Evaluating Solid Waste* (SW-846) (EPA 2008), will ensure that quality data are generated for comparison to federal and state regulatory standards.

3.2 QUALITY ASSURANCE OBJECTIVES

Project QA objectives can be expressed in terms of precision, accuracy, representativeness, completeness, and comparability of analytical results.

Precision is a measure of the degree to which two or more measurements agree. Precision will be evaluated by calculating the relative percent difference (RPD) between duplicate sample results. Two types of duplicate samples will be analyzed as part of the project: laboratory duplicate samples and field duplicate samples. The desired RPD for duplicate sample results is 50 percent or less, as listed in Section 4.3 of the QAPP Addendum (see Appendix C).

Accuracy is the degree of agreement between a measured value and a standard reference value. Accuracy will be evaluated by calculating percent recoveries for the internal standard chemicals added to each sample. Acceptance criteria for laboratory quality control (QC) samples are specified in the analytical methods.

Representativeness expresses the degree to which the data obtained accurately represent a process or environmental condition. Representativeness is a qualitative parameter that depends on a properly designed sampling program. Sampling will be designed to capture as much of the material to be sampled as possible in each sample. The number of samples collected will be appropriate for the size, uniformity, and content of the material to be sampled.

Completeness is measured by comparing the amount of valid data obtained from a measurement system to the planned amount of data. The equation in Section 2.5.3.3 of the REPA Zone III programmatic QAPP (Toeroek 2013) will be used to calculate percent completeness for the project. The completeness goal for the project is 100 percent.

Comparability expresses the confidence with which one data set can be compared to another. For the project, comparability will be achieved primarily by application of standard EPA analytical methods. All sample analytical results will be reported in standard units. All laboratory calibrations will be based on standards traceable to the National Institute of Standards and Technology. Comparability will also be maximized through application of consistent sample collection techniques and analytical methods throughout the project.

4.0 SAMPLING REQUIREMENTS

EPA has tasked the Toeroek team with installing two permanent monitoring wells, as well as conducting sampling at the former Electrolux facility in Jefferson, Iowa. The purpose of the sampling investigation is to obtain adequate data to allow EPA to evaluate the facility in order to develop specifications for closure required to protect human health and the environment. Primary components of the sampling investigation are as follows:

- Install and develop two permanent monitoring wells to 150 feet bgs, and with screened intervals from 135 to 145 feet bgs in accordance with EPA Guidance titled *Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells* (EPA 1991).
- Collect two groundwater samples from each well by application of micro-purge ("low-flow") sampling methodology.
- Survey each installed well to determine accurate global positioning system (GPS) coordinates, as well as elevations of the ground surface and top of casing in feet AMSL.

Activities associated with these tasks are described in the following subsections and in the site-specific QAPP Addendum (see Appendix C). Activities during the facility visit will be recorded in a dedicated field logbook and a photographic record. As discussed in Section 5.0, any necessary deviations from the work plan will be discussed with the EPA TOCOR and documented in the field log book.

4.1 MOBILIZATION AND DEMOBILIZATION

The Toeroek team will perform the following mobilization and demobilization activities associated with the sampling investigation: coordinating with the well drilling subcontractor, ordering and returning field equipment, assembling sample supplies, shipping/delivering samples to the EPA Region 7 laboratory, and coordinating with the survey subcontractor.

Because the EPA TOCOR has directed the Toeroek team to install the wells within city street right-of-ways, the Toeroek team will discuss access arrangements for the well drilling in advance of field sampling with City of Jefferson officials.

The Toeroek team will obtain sampling supplies such as sample containers, labels, and preservatives from the EPA Region 7 laboratory prior to the sampling visit. Following the sampling visit, the Toeroek team will deliver the samples to the laboratory via overnight courier or by hand delivery.

4.2 WELL DRILLING

The proposed wells will be completed in the Pleistocene sand and gravel complex. Proposed monitoring well locations are shown on Figure 3, Appendix A. Boreholes for monitoring wells will be completed via a roto-sonic drilling method that will allow collection of a continuous core. The continuous core will be extruded into a polyethylene sleeve in 10-foot intervals for logging. The top, bottom, and depths will be marked on the plastic. Well borings may be logged from auger cuttings for submittal of required well registration logs.

Monitoring wells will be in downgradient areas where soil contamination is not anticipated. The City has agreed that well cuttings may be transported to the City landfill for disposal.

4.3 WELL DESIGN AND INSTALLATION

Monitoring wells will be constructed in accordance with EPA Guidance titled *Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells* (EPA 1991), as well as any State of Iowa requirements and specifications as outlined in the following sections.

4.3.1 Well Riser

Well risers for the monitoring wells will consist of 2-inch-diameter Schedule 40 polyvinyl chloride (PVC). Threaded joint couplings, to form watertight unions, will join riser sections. Adhesives or solvents will not be used to join the casing sections. Use of Teflon tape on threaded joints is acceptable and will be noted on the well construction log. Each riser section will be kept in its factory wrapping and off the ground until installed in the borehole.

4.3.2 Well Screen

Well screens will be 10-foot lengths with 0.010-inch slot size and constructed of the same size and strength material as the well risers. The bottom of the screen will be equipped with a 0.25 or 0.5-foot PVC end cap. Field slotted screen is not permitted.

4.3.3 Well Completions

Per requests from EPA, all monitoring wells will be flush mounted completions as described below.

Each well will be protected from entry of foreign materials at all times, and upon completion, each well will be secured with a protective well vault installed around the well casing that will have been cut off

about 0.3 foot below grade. This vault will be set into the cement surface before it cures, with the vault lid flush with the surrounding well pad or concrete sidewalk/parking lot. To ensure a watertight seal, use of expanding cement that bonds tightly to the vault is required. In addition, a flexible o-ring gasket will be installed between the vault and vault lid. Drainage will be directed away from wells completed in areas where significant runoff may occur. Well vaults in traffic areas must be rated for car and truck traffic.

Locks

To prevent theft or tampering with the monitoring wells, a lock will be installed on each well cap. A copy of the key to access the lock will be maintained by the Toeroek Team.

Well Pad

Both wells will be installed along city or county rights-of-way, which may include sidewalks, streets, alleys, or maintained easements (see Figure 3, Appendix A). If a well is placed in a street or sidewalk, concrete will be placed around the upper portion of casing, and the well vault will be finished to match the surrounding grade of the sidewalk or road.

Concrete pads will be required for any wells installed in unpaved areas. These pads will be a minimum of 2.5 feet by 2.5 feet square by 8 inches thick (at borehole), and sloped away from the well with the top outer edge meeting ground level elevation. Circular well pads with diameter of about 2.5 feet may be installed instead of square pads where appropriate. Well pads within City streets or alleys will have 6-8 inches of concrete as needed to match thickness of pavement and withstand traffic.

Well Identification

A permanent corrosion-resistant tag will be affixed to the well cap or to the inside of the well vault or vault lid. The tag will clearly identify the well number, depth, screened interval, and date of installation. The well will also be clearly identified as a groundwater monitoring well.

4.3.4 Filter Pack

The annular space around the well screen will be backfilled with clean, washed, well-rounded silica sand sized to perform as a filter between the formation material and the well screen. The filter pack material will be placed in such a manner as to avoid bridging and to ensure a continuous filter pack throughout the

screened interval of the well. The filter pack will extend approximately 1 foot below and 2 to 4 feet above the well screen.

Grain size of the filter pack material is expected to be a 10/20 or 12/20 mesh sand.

4.3.5 Bentonite Seal

A minimum 3-foot thick bentonite seal will be tremied or gravity fed into place in the annular space above the well screen and filter pack sand. The seal will be composed of commercially manufactured sodium bentonite pellets or granules. Bentonite pellets will not exceed 0.5-inch diameter. The bentonite pellet seal will be allowed to hydrate a minimum of 2 hours before grouting begins. If the bentonite seal is positioned above the water table, granular bentonite will be installed in 1-foot lifts with each lift hydrated a minimum of 20 minutes before the next lift is placed. Clean, potable water will be added to hydrate the bentonite. After placement of the final lift, the granular bentonite seal will be allowed to hydrate an additional 2 hours before grouting begins. Time-release bentonite pellets may be used for seals placed within the saturated zone.

4.3.6 Annular Seal

Only State-approved grouts may be used, and grout placement must accord with applicable State regulations. Cement or bentonite grout will be placed above the bentonite seal to the ground surface. Cement grout will consist of a mixture of Portland cement (ASTM C 150) and water in the proportion of not more than 7 gallons of approved water per bag of cement (94 pounds). Additionally, 3 percent by weight of sodium bentonite powder will be added unless prohibited by state or local regulations. Grout will be placed by pumping through a side-discharging tremie pipe with the lower end of the tremie pipe within 3 feet of the top of the bentonite seal. Pumping will continue until undiluted grout flows from the boring at ground surface. Commercially available bentonite grout products approved by the State may also be used.

4.3.7 Temporary Capping

Any well that is to be temporarily removed from service or left incomplete due to delays in construction will be capped with a watertight cap and equipped with a "vandal proof" cover that satisfies applicable state or local regulations.

4.4 WELL DEVELOPMENT

Within 1 week after each well has been constructed, but no sooner than 24 hours after grouting is completed, well development will be completed without use of dispersing agents or acids. Objectives of well development are to: (1) assure that groundwater enters the well screen freely, thus yielding a representative groundwater sample and an accurate water level measurement; (2) remove all water that may have been introduced during drilling and well installation; and (3) remove very fine-grained sediment in the filter pack and nearby formation so that groundwater samples are not highly turbid and silting of the well does not occur.

Development will consist of mechanical surging (with a pump, bailer, or surge block) and pumping for about 2 hours at each well. Typically, the well is surged for about 10 minutes at different depths within the interval screened and then pumped until the water becomes clear. This process of pumping and surging is repeated about four or five times at each well to remove sediment entering the well. At the end of that time, the well will be continuously pumped for a minimum of 15 minutes by use of an electric submersible pump. Temperature, pH, specific conductivity, and turbidity will be monitored by Tetra Tech during this pumping. Pumping will continue until these parameters have stabilized (less than 0.2 pH units or a 10 percent change in all other parameters among three consecutive readings), and the water is clear and free of fines.

4.5 WELL SURVEYING

Each monitoring well will be surveyed by an Iowa licensed surveying contractor. The survey will include measurement of accurate GPS coordinates for each well, as well as the control point used in the survey. In addition to the coordinates, elevations of the ground surface and top of casing will be recorded for each well in feet AMSL and will be accurate to 0.01 foot. A copy of the survey report will be included in the final report.

4.6 WELL SAMPLING

Sample collection from the monitoring wells will proceed by application of micro-purge ("low-flow") sampling methodology. This consists of purging groundwater directly from the screened portion of the well at a very low flow rate (less than [<] 200 milliliters per minute [mL/min]). Samples from monitoring wells will be collected via a QED sample Pro 1.75-inch Bladder Pump (or similar), through bonded 0.25-inch low density polyethylene (LDPE) tubing and through a Horiba U-50 (or similar) multi-parameter water quality meter. The water quality meter will provide measurements of water quality

parameters such as temperature, pH, conductivity, dissolved oxygen, and turbidity. Water quality parameters will be recorded at regular intervals (approximately 4 minutes) until the parameters will have stabilized. Stabilization is accomplished when respective water quality parameters measured at terminations of three consecutive time intervals (e.g., three measurements of dissolved oxygen) are within 10 percent.

Samples will be collected in laboratory-prepared sample containers, labeled, and placed in an ice-filled cooler kept at temperatures between 2 and 6 degrees Celsius (°C) (see Table 1 in Appendix B). Samples will be properly documented on the chain of custody, packaged, and delivered to the EPA Region 7 laboratory in Kansas City, Kansas.

4.7 QUALITY CONTROL SAMPLING

QC samples to be collected during the sampling investigation include a groundwater field duplicate sample, one water field blank, one trip blank, and a matrix spike/matrix spike duplicate (MS/MSD) sample.

The field duplicate sample will be collected to assess precision of field sample collection and laboratory analysis procedures. The field duplicate sample will be collocated with an original sample. The EPA Region 7 laboratory will analyze the field duplicate sample applying the same method and for the same analytes as the collocated original sample.

Field blanks are collected as an indication of overall precision. Field blank samples are collected at a frequency of one per sampling event. The EPA Region 7 laboratory will analyze the field blank applying the same methods and for the same analytes as the original samples. Additionally, one trip blank will be prepared by the EPA Region 7 laboratory to determine whether contamination will have been introduced during transportation of the containers/samples. The trip blank sample will be analyzed for VOCs.

One MS/MSD sample will be collected for assessment of accuracy of laboratory analyses.

All QC samples will be collected in laboratory-prepared sample containers, labeled, and placed in an ice-filled cooler kept at temperatures between 2 and 6 degrees °C (see Table 1 in Appendix B). Samples will be properly documented on the chain of custody, packaged, and delivered to the EPA Region 7 laboratory in Kansas City, Kansas.

4.8 DECONTAMINATION

All drilling equipment, surface and downhole, including drill pipe and drive casing, tanks, etc., will be high-pressure spray washed prior to first use, prior to mobilization to each new borehole, and prior to mobilization from the facility after installation of the final well. The drill rig will be decontaminated after completion of drilling, or as needed, per discretion of the Tetra Tech site manager.

A temporary decontamination space will be constructed at the facility. This space will be capable of containing all fluids produced during decontamination and steam cleaning of drilling and sampling equipment. Upon completion of decontamination activities, or on a periodic basis as necessary, decontamination fluids will be pumped from the temporary containment into portable tanks or drums and transported to the municipal wastewater treatment plant (WWTP) or to a location designated by the City (e.g., a sanitary sewer manhole) for disposal. The City has indicated that disposal of decontamination water may occur at the WWTP. If necessary, decontamination water will be drummed and the drums will be transported to a centrally located area designated by the Tetra Tech site manager.

The Toeroek team will decontaminate non-disposable field equipment, such as groundwater sampling equipment, after completion of sampling at each sample location. Decontamination will consist of thoroughly scrubbing the equipment with a non-phosphate detergent solution, and rinsing the equipment with potable water.

4.9 INVESTIGATION-DERIVED WASTE

Investigation-derived waste will include drill cuttings, development water, and decontamination fluids generated during the well installation/development activities. Drill cuttings will be transported for disposal at the City landfill. Drill cuttings will be collected in clean 55-gallon drums or similar contains that can be properly sealed and labeled. Development water and decontamination fluids will be containerized in totes or polyethylene tanks for transport and disposal at the WWTP.

4.10 ANALYTICAL REQUIREMENTS

All samples collected during the project will be analyzed by the EPA Region 7 laboratory. This section identifies analytical target parameters and methods that will be applied to meet overall project objectives.

The laboratory will report results for all target analytes listed in Table 2 in Appendix B. Reporting limits for groundwater samples will be EPA maximum contaminant levels (MCL) or EPA regional screening levels (RSL) for tap water in cases of analytes for which no MCLs have been established. EPA analytical methods are commonly applied, and results are easily obtained; therefore, these methods are not discussed in detail in this section. For more information on precision, accuracy, and other QC requirements, see the QAPP Addendum (Appendix C). Calibration procedures, frequency of continuing calibration verification, and criteria for evaluating the calibration data are described in the EPA analytical methods.

Calibration data will be recorded in the instrument logbook and referenced to the standards preparation log in order to identify the sources and methods of preparation of the standard solutions used.

The Toeroek team will review and validate all data generated by the laboratory. The validation review will identify problems and QC deficiencies readily apparent from the data package.

5.0 DEVIATIONS FROM QAPP AND SAP

The Toeroek team anticipates that during the project, all procedures for sampling, sample custody, calibration, analyses, data validation, and data reporting will comply with the requirements specified in the REPA Zone III programmatic QAPP (Toeroek 2013) and this SAP. Any deviations during sampling will be identified by the Toeroek team and communicated to the EPA TOCOR. Any deviations during sample analysis will be identified by the EPA Region 7 laboratory, communicated to the Toeroek team Technical Directive Manager for Technical Directive No. 8, and discussed with the EPA TOCOR. The EPA TOCOR will make a final determination as to whether any deviation from the REPA Zone III programmatic QAPP or the SAP requires corrective action.

6.0 OVERALL PROJECT SCHEDULE

The Toeroek team is prepared to begin fieldwork within 30 days of EPA approval of this SAP and the attached QAPP Addendum (see Appendix C). Completion of sampling activities is expected to take approximately 4-5 continuous days, including travel time. Following field implementation, the Toeroek team will submit a draft report of sampling investigation activities and results within 45 days.

Table 3 in Appendix B is a tentative schedule of key project events. Dates may change based on the amount of time required to conduct laboratory analyses or review deliverables.

7.0 KEY PROJECT PERSONNEL

Organizations participating directly in the project include EPA and the Toeroek team. Addresses and telephone numbers of key project contacts are as follows:

EPA TOCOR

Brian Mitchell
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Telephone: (913) 551-7633

Toeroek Team Technical Directive Manager

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Kansas City, MO 64106
Telephone: (816) 412-1745

8.0 REFERENCES

Golder Associates, Inc. (Golder). 2016. Site Assessment Summary Report, Former Electrolux Home Products, Inc. Facility, Jefferson, Iowa. October.

Greene County, Iowa Assessor's Office. 2016. Online Parcel Report. Accessed November 15, 2016. http://greeneia.mygisonline.com/

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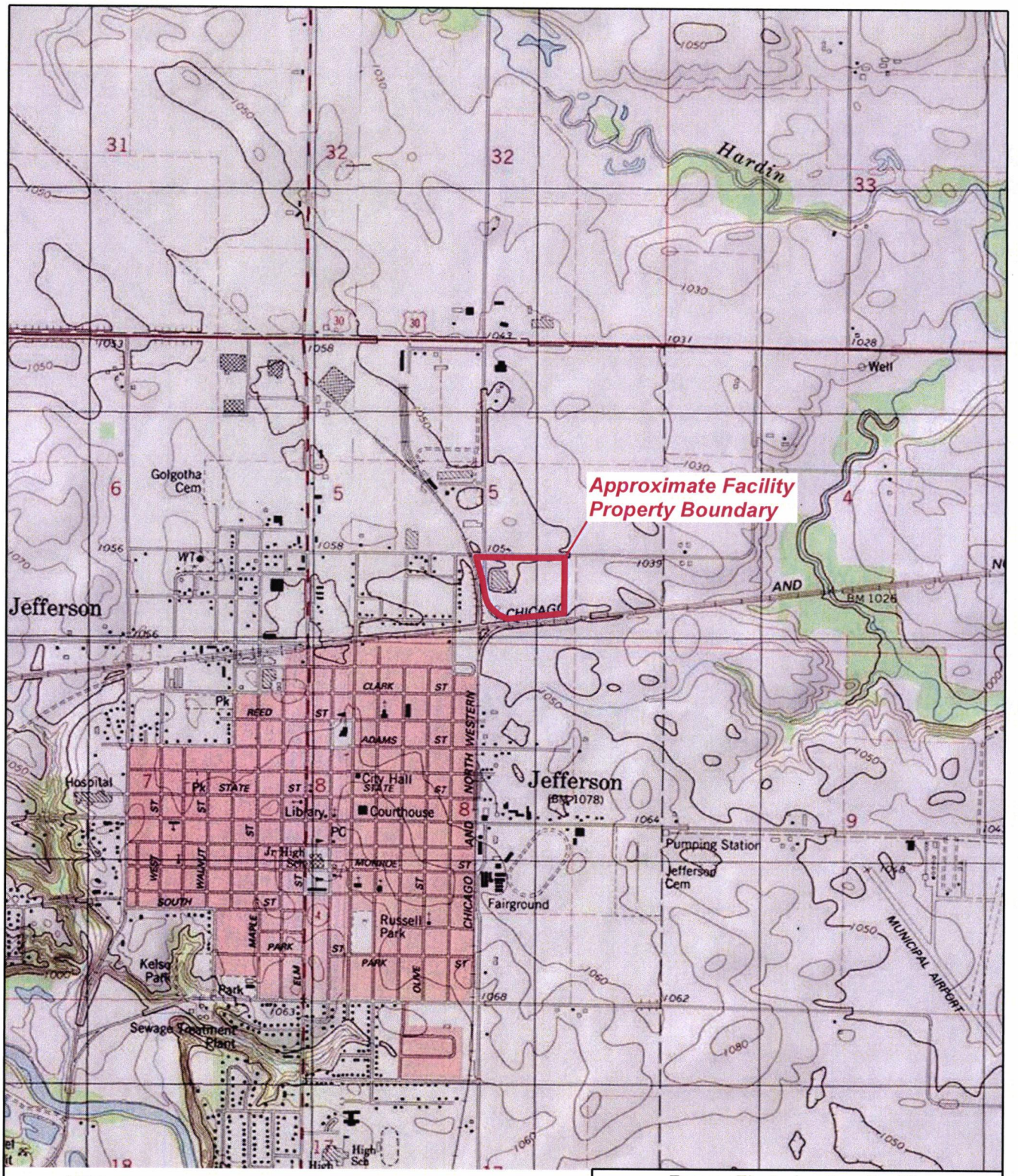
U.S. Geological Survey (USGS). 1986. Jefferson East, Iowa Quadrangle. 7.5-Minute Topographic Series.

APPENDIX A

FIGURES



Source: Jefferson West, Iowa USGS 7.5 Minute Topo Quad, 1986;
Jefferson East, Iowa USGS 7.5 Minute Topo Quad, 1986.

N

0 1,000 2,000

Feet

Former Electrolux, Inc. Facility
601 East Central Avenue
Jefferson, Iowa

Figure 1
Facility Location Map

TETRA TECH

Date: 11/17/2016 Drawn By: Nick Wiederholt Project No: 103Z2642035.48.04

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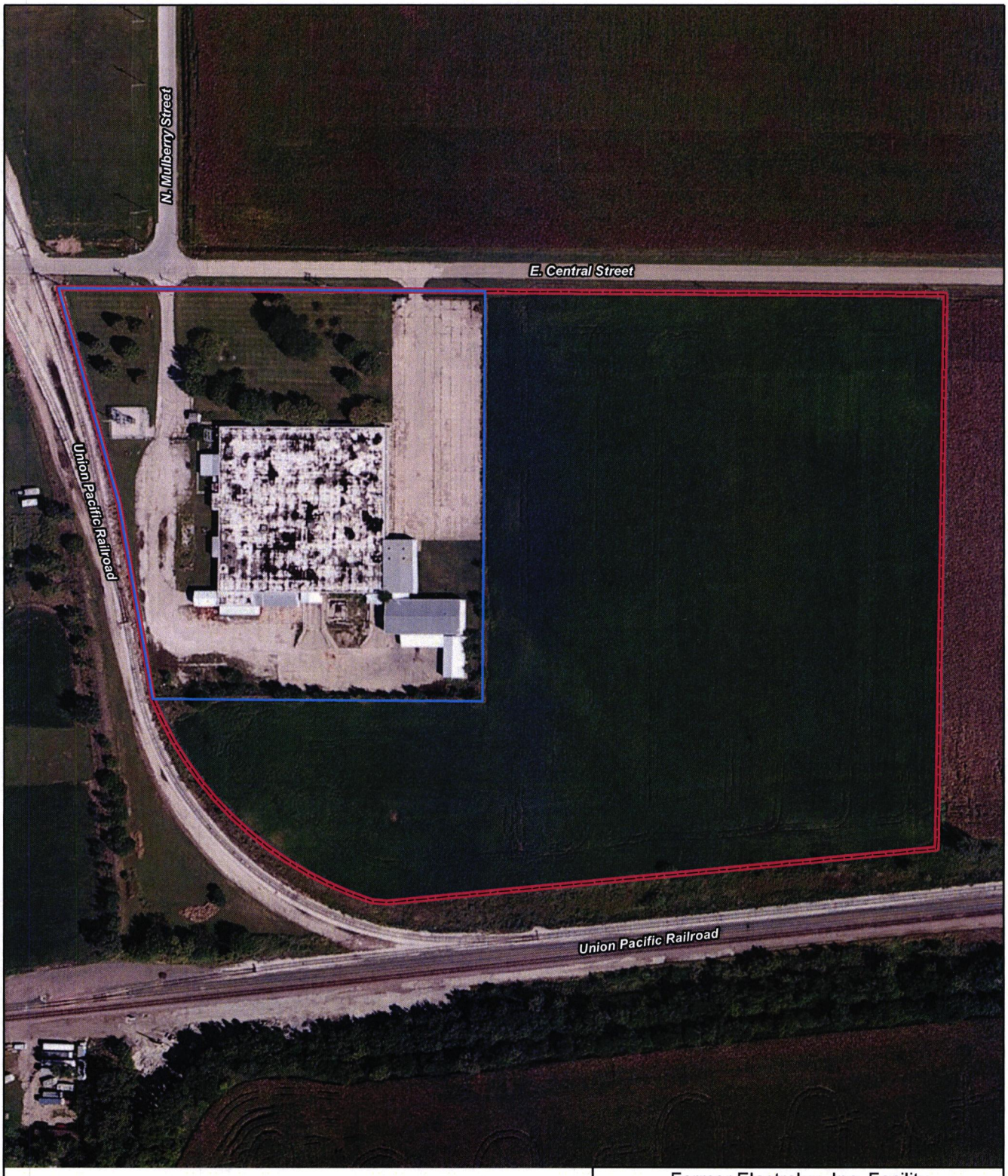

Legend

Approximate facility property boundary

Former manufacturing area

N

0 100 200

Feet

Source: ESRI, ArcGIS Online, Aerial Imagery, 2015.

Former Electrolux, Inc. Facility
601 East Central Avenue
Jefferson, Iowa

Figure 2
Facility Layout Map

TETRA TECH

Date: 11/17/2016 Drawn By: Nick Wiederholt Project No: 103Z2642035.48.04

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Legend

- Proposed monitoring well
- Approximate facililty property boundary
- Former manufacturing area

N

0 200 400

Feet

Source: ESRI, ArcGIS Online, Aerial Imagery, 2015.

Former Electrolux, Inc. Facility
601 East Central Avenue
Jefferson, Iowa

Figure 3
Proposed Monitoring Well Location Map

TETRA TECH

Date: 12/5/2017 Drawn By: Kirk Mammoliti Project No: 103Z2642035

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APPENDIX B

TABLES

TABLE 1

REQUIRED SAMPLE VOLUMES, CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES

Parameter	Matrix	Method (SW-846)	Volume and Container	Preservation Technique	Holding Time (Extraction/Analysis)
VOCs	Water	8260B	3 x 40 mL vials	Store at 4 °C, HCl	14 days

Notes:

°C Degrees Celsius
EPA U.S. Environmental Protection Agency
HCl Hydrochloric acid
mL Milliliter
VOC Volatile organic compound

TABLE 2

TARGET ANALYTES

Parameter	Matrix	Method (SW-846)
VOCs	Water	EPA SOP 3230.1 or 3230.13 (low level) by SW-846 Method 8260

Notes:

VOCs Volatile organic compounds

TABLE 3

SCHEDULE FOR KEY PROJECT EVENTS

Day	Project Activity
March 14, 2018	The Toeroek team submits the project-specific SAP and QAPP Addendum to EPA.
April 16, 2018	EPA provides the Toeroek team review comments on the project-specific SAP and QAPP Addendum.
April 17, 2018	The Toeroek team revises and resubmits the project-specific SAP and QAPP Addendum to EPA.
TBD	EPA approves the site-specific SAP and QAPP Addendum.
TBD	The Toeroek team mobilizes to Electrolux facility to conduct sampling.
TBD	The Toeroek team demobilizes and delivers samples to EPA Region 7 laboratory.
TBD	EPA Region 7 laboratory provides analytical results to the Toeroek team.
TBD	The Toeroek team submits the draft sampling report to EPA.
TBD	EPA provides the Toeroek team review comments on the sampling report.
TBD	The Toeroek team revises and resubmits the sampling report to EPA.

Notes:

EPA U.S. Environmental Protection Agency
QAPP Quality assurance project plan
SAP Sampling and analysis plan
TBD To be determined

APPENDIX C

QUALITY ASSURANCE PROJECT PLAN ADDENDUM

U.S. Environmental Protection Agency (EPA) Region 7
Site-Specific Quality Assurance Project Plan (QAPP) Addendum

Project Information:

Facility Name: Electrolux	**City:** Jefferson	**State:** Iowa
EPA Task Order Contracting Officer Representative (TOCOR): Brian Mitchell	**Toeroek Team Task Order Manager (TOM):** Kirk Mammoliti	

Approved By:	**Approval Date:**
EPA TOCOR: Brian Mitchell Brian Mitchell	EPA TOCOR: 3/15/18
EPA Quality Assurance (QA) Manager: Diane Harris Diane Harris (approved with condition)	EPA QA Manager: 04/20/2018
Toeroek Team TOM: Kirk Mammoliti Kirk Mammoliti	Toeroek Team TOM: 3/15/18
Toeroek Team REPA QA Officer: Kevin Geraci Kevin Geraci	Toeroek Team REPA QA Officer: 3/15/18

1.0 Project Management:

1.1 Distribution List:

EPA Region 7	Brian Mitchell, TOCOR Diane Harris, EPA Region 7 QA Manager
Toeroek Team	Kirk Mammoliti, Task Order Manager Paul Kieler, Toeroek Team Program Manager Kathy Homer, Toeroek Team Regional Manager Kevin Gerachi, Toeroek Team QA Officer

1.2 Project/Task Organization:

Brian Mitchell—Resource Conservation and Recovery Act (RCRA) Waste Remediation and Permitting Branch, Air and Waste Management Division, EPA Region 7—will serve as the TOCOR for the activities described in this site-specific QAPP Addendum. Kirk Mammoliti, Toeroek team, will serve as the TOM for activities described in this document. The Toeroek team Regional Manager will provide technical assistance, as needed, to ensure that necessary issues are adequately addressed.

1.3 Problem Definition/Background:

Description: This site-specific QAPP form was prepared as an addendum to the Toeroek RCRA Enforcement, Permitting and Assistance (REPA) 5 Region 7 QAPP, and specifies data quality objectives (DQO) for the sampling activities described herein at the former Electrolux Home Products, Inc. (Electrolux) facility.

The former Electrolux facility is at 601 East Central Avenue in Jefferson, Greene County, Iowa.

The approximately 21-acre Electrolux property formerly included a 75,500-square-foot facility that manufactured dishwasher motor transmissions from 1960 until decommissioned in March 2011. The former manufacturing building was demolished, and the site now includes a 7.5-acre area of concrete building slabs, parking lots, fencing, and sidewalks where manufacturing activities previously occurred. In 2010, Electrolux began to evaluate possibly present subsurface contamination derived from manufacturing activities. A phased site assessment approach was followed from 2010 through 2013 to assess site subsurface conditions downgradient of and within areas exterior to the former manufacturing facility. Additional groundwater monitoring occurred in 2014, and a site assessment and summary report including a conceptual site model was completed in October 2016.

Results from the site assessments indicate that soil and groundwater at the site are contaminated with chlorinated volatile organic compounds (CVOC), primarily trichloroethene (TCE) and its breakdown constituents, within the upper tills (identified within 0 to 40 feet below ground surface [bgs]). CVOC-impacted soils were found only within the footprint of the former facility and adjacent landscaped areas within 1 to 7 feet bgs. Highest concentrations of CVOCs in groundwater were detected in the yellow brown till within approximately 30 to 40 feet bgs near the southeast portion of the former facility. The site assessment report concluded that natural attenuation and chlorinated degradation were occurring at the site, and that the extent of contamination was within Electrolux property boundaries. Suspected sources of volatile organic compound (VOC) contamination at the site are former manufacturing operations within the eastern portion of the facility.

An additional investigation completed in April 2017 included collection of groundwater samples by use of a direct-push technology (DPT) drilling rig. Four groundwater samples were collected at two temporary wells downgradient (south) of the former facility. VOCs were not detected in any sample collected during the sampling event. Not all targeted sampling intervals were reached during the investigation due to limitations of the DPT drilling rig.

Although the contamination is currently confined within facility boundaries, the Jefferson public water supply is sourced from six groundwater wells in the Pleistocene sand gravel complex at approximately 150 feet bgs. Documents obtained from the Jefferson Water Department Source Water Protection Plan indicate that the southwest portion of the former facility is within the 10-year capture zone of four of those Jefferson supply wells. One monitoring well within the former facility boundaries is screened within the Pleistocene sand gravel complex. No VOC was detected at a concentration above its laboratory reporting limit in groundwater samples collected from this well.

1.4 Project/Task Description:

The Toeroek team and its subcontractors will install, develop, and sample two permanent monitoring wells. The wells will be installed to approximately 150 feet bgs and screened from approximately 135 to 145 feet bgs within the Pleistocene sand gravel complex.

Following the installation, the wells will be developed with objectives of (1) ensuring that groundwater enters the well screen freely, (2) ensuring that all water introduced during the installation will have been removed from the well, and (3) removing very fine-grained sediment in the filter pack and nearby formation so that groundwater samples are not highly turbid and silting of the well does not occur.

Following development, a sample will be collected from each well by application of micro-purge (also referred to as "low-flow") sampling methodology. The collected samples will be submitted for VOC analysis at the EPA Region 7 Laboratory in Kansas City, Kansas.

U.S. Environmental Protection Agency (EPA) Region 7
Site-Specific Quality Assurance Project Plan (QAPP) Addendum

1.5 Quality Objectives and Criteria for Measurement Data:

See Table 1 "Sample Summary" and Table 2 "Data Quality Objectives Summary."

1.6 Special Training/Certification Requirements:

Field personnel are required to have completed a basic 40-hour health and safety (Hazardous Waste Operations and Emergency Response) training course and annual refreshers. Familiarization with sampling equipment and procedures will also be necessary for the Toeroek field personnel.

1.7 Documentation and Records:

X	Field Sheets	X	Site Log	X	Photos	O	Video	X	Site Maps
X	Chain of Custody	O	Trip Report	X	Report	X	Health & Safety Plan		

X Sample documentation will follow EPA Region 7 Standard Operating Procedure (SOP) 2420.5C – Identification, Documentation and Tracking of Samples.

X Well registration logs will be completed and submitted to the Iowa Department of Natural Resources (IDNR) and included in the report.

X Other: Analytical information will be handled according to procedures identified in Table 2.

2.0 Measurement and Data Acquisition:

2.1 Sampling Process Design:

The purpose of the sampling investigation is to obtain adequate data to allow EPA to evaluate the site in order to develop specifications to protect human health and the environment. Primary components of the sampling investigation are as follows:

- Install and develop two permanent groundwater wells to approximately 150 feet bgs with an approximate screened interval of 135 to 145 feet bgs. The wells will be flush mount completions to the surface, and will be registered with IDNR.
- Following development, a sample will be collected from each monitoring well by application of micro-purge (also referred to as "low-flow") sampling methodology. Collected samples will be analyzed for VOCs.
- Each well will be surveyed to determine accurate global positioning system (GPS) coordinates, as well as elevations of the ground surface and top of casing in feet above mean sea level (msl).

The EPA Region 7 analytical laboratory will analyze the samples. Analyses will be completed within a standard turnaround time. Quality control (QC) samples to be collected during the sampling investigation include one groundwater field duplicate (per 20 groundwater samples collected), one water field blank (per sampling event), and one trip blank (accompanying samples during shipment to the laboratory). In addition, a matrix spike/matrix spike duplicate (MS/MSD) sample will be collected.

These samples will be analyzed for the same constituents as the original samples. Tables 1 and 2 summarize the matrix types, analyses requested, approximate locations, and numbers of samples proposed for sample collection under this QAPP Addendum.

2.2 Sample Methods Requirements:

Collection of original and QA/QC samples will accord with EPA SOPs. Table 1 summarizes original and QA/QC samples to be collected, and relevant sample collection SOPs. Table 2 summarizes DQOs and relevant sample handling SOPs.

2.3 Sample Handling and Custody Requirements:

Samples will be packaged and preserved in accordance with procedures defined in Region 7 EPA SOP 2420.06. A chain of custody will be maintained as directed by Region 7 EPA SOP 2420.04. Samples submitted to the EPA Region 7 laboratory will be accepted according to Region 7 EPA SOP 2420.01.

2.4 Analytical Methods Requirements:

Original and QA/QC samples will be analyzed by the EPA Region 7 analytical laboratory according to the guidelines and target reporting limits specified in EPA SOPs. A standard, 30-day turnaround time will be requested for all samples (see Table 1).

2.5 Quality Control Requirements:

QC samples will be submitted for the analyses listed in the attached tables. Evaluation of blank samples depends on the levels of contamination found in environmental samples to determine whether the environmental samples are representative. Analytical results from the blank samples will be evaluated on a qualitative basis by the EPA Project Manager and EPA contractor(s) to determine a general indication of field-introduced and/or lab-introduced contamination. Analytical results from field duplicate samples will be referenced to calculate the relative percent difference (RPD) between each set of duplicate pair results for each reported analyte. For this investigation, one groundwater field duplicate will be collected to evaluate total method precision. One field blank (water) will be prepared in the field with deionized (DI) water provided by the EPA laboratory. The field blank will be prepared to evaluate contamination of sampling containers and/or preservatives, and to assess contamination potentially introduced during sampling and laboratory procedure(s). One water trip blank will be prepared by the EPA Region 7 laboratory to determine whether contamination will have been introduced during transportation of the containers/samples. Also, an MS/MSD sample will be collected.

2.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements:

Testing, inspection, and maintenance of analytical instrumentation will accord with the previously referenced SOPs and/or manufacturers' recommendations. Testing, inspection, and maintenance of field instruments (GPS units, etc.) will accord with manufacturers' recommendations.

2.7 Instrument Calibration and Frequency:

Calibration of laboratory equipment will proceed as described in the previously referenced SOPs and/or manufacturers' recommendations. Calibration checks of field instruments will occur daily, as specified in the manufacturers' recommendations.

2.8 Inspection/Acceptance Requirements for Supplies and Consumables:

Certificates of analysis are provided with sampling supplies and will be reviewed by the field sampling team prior to sample collection. No additional special requirements are needed.

2.9 Data Acquisition Requirements:

Data acquisition requirements for any secondary information, including other analytical data, reports, photographs, maps, and so on, which are referenced in this QAPP, will follow the EPA Region 7 Programmatic QAPP.

2.10 Data Management:

All data acquired by the EPA Region 7 laboratory will be managed in accordance with Region 7 EPA SOP 2410.01.

3.0 Assessment and Oversight:

3.1 Assessment and Response Actions:

Because of the short duration of this sampling event, the Toeroek team will conduct no field audits of sampling procedures. Assessment and response actions pertaining to analytical phases of the project associated with the EPA Region 7 laboratory are addressed in Region 7 EPA SOPs 2430.06 and 2430.12.

3.1A Corrective Action:

Corrective actions will be at the discretion of the EPA TOCOR whenever problems appear that could adversely affect data quality and/or resulting decisions affecting future response actions pertaining to the site.

3.2 Reports to Management:

Laboratory results will be reported to the TOCOR by the EPA Region 7 laboratory. Following completion of the field activities described herein and receipt of validated laboratory data, the Toeroek team will prepare and submit to EPA a report describing sampling techniques, locations, problems encountered (with resolutions to those problems), and interpretation of analytical results. A summary report will also be prepared by the EPA TOCOR for submittal to EPA Region 7 management, documenting the status of the site and specifying any further response actions.

4.0 Data Validation and Usability:

4.1 Data Review, Validation, and Verification Requirements:

Data review and verification of analytical results generated by the EPA Region 7 laboratory will be performed by a qualified analyst and the laboratory's section manager as described in Region 7 EPA SOPs 2430.12 and 2410.10.

4.2 Validation and Verification Methods:

The EPA TOCOR will inspect the data to provide a final review. The EPA TOCOR will review the data, if applicable, for laboratory spikes and duplicates, laboratory blanks, and field duplicates to ensure the data are acceptable. The EPA Project Manager will also compare the sample descriptions with field sheets for consistency, and will ensure appropriate documentation of any anomalies in the data.

4.3 Reconciliation with User Requirements:

If DQOs do not meet the project requirements identified in this QAPP Addendum and the Sampling and Analysis Plan, the data may be discarded, and re-sampling or re-analysis may occur (as determined by the EPA TOCOR). An RPD of 50 percent or less is necessary for all duplicate samples. Duplicate sample data with an RPD exceeding 50 percent will be reviewed by the EPA TOCOR and the Toeroek team TOM for validity.

U.S. Environmental Protection Agency (EPA) Region 7 Site-Specific Quality Assurance Project Plan (QAPP) Addendum							
Table 1: Sample Summary							
Site Name: Electrolux				**Location:** Jefferson, Iowa			
Technical Directive Manager: Kirk Mammoliti				**Activity/ASR #:** To be determined			**Date:** March 2018
No. of Samples	**Matrix**	**Location**	**Purpose**	**Depth or other Descriptor**	**Requested Analysis**	**Sampling Methods**	**Analytical Methods**
2	Water	Monitoring wells	To assess contaminant concentrations in the Pleistocene sand and gravel complex	Samples will be collected within screened intervals – approximately 135-145 feet bgs	VOC	EPA SOPs 4232.2048 4232.2044 4231.2007	SOP 3230.1 or 3230.13 (low level) by SW-846 Method 8260
QC Samples							
Duplicates							
1	Water	Field Duplicate	To assess precision of analytical and sampling methods	Not applicable	VOCs	EPA SOPs 4232.2048 4232.2044 4231.2007	SOP 3230.1 or 3230.13 (low level) by SW-846 Method 8260
Blanks							
1	Water	Field blank	To assess field-introduced and lab-introduced contamination	Not applicable	VOCs	N/A	SOP 3230.1 or 3230.13 (low level) by SW-846 Method 8260
1	Water	Trip blank	To assess transportation-related contamination	Not applicable	VOCs	N/A	SOP 3230.1 or 3230.13 (low level) by SW-846 Method 8260
				Other			
1	Water	MS/MSD	To assess accuracy of laboratory analysis	Not applicable	VOCs	N/A	SOP 3230.1 or 3230.13 (low level) by SW-846 Method 8260

Notes:

ASR	Analytical Services Request	QC	Quality control
bgs	Below ground surface	SOP	Standard operating procedure
MS	Matrix spike	VOC	Volatile organic compound
MSD	Matrix spike duplicate		
N/A	Not applicable		

U.S. Environmental Protection Agency (EPA) Region 7 Site-Specific Quality Assurance Project Plan (QAPP) Addendum								
Table 2: Data Quality Objectives Summary								
Site Name: Electrolux				**Location:** Jefferson, IA				
Technical Directive Manager: Kirk Mammoliti				**Activity/ASR #:** NA		**Date:** March 2018		
Analysis	**Analytical Method**	**Data Quality Measurements**					**Sample Handling Procedures**	**Data Management Procedures**
		Accuracy	**Precision**	**Representativeness**	**Completeness**	**Comparability**		
Soil and Water Samples								
VOCs	See Table 1	Per analytical method	Per analytical method	Judgmental sampling based on professional judgment of the sampling team	100%; No specific critical samples have been identified.	Standardized procedures for sample collection and analysis will be used.	See Section 2.3 of QAPP form.	See Section 2.10 of QAPP form

Notes:

ASR Analytical Services Request
VOC Volatile organic compound